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STUDIES  
IN  
PATHOLOGICAL ANATOMY

*ESPECIALLY IN RELATION TO LARYNGEAL  
NEOPLASMS*

I.—PAPILLOMA

BY

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LONDON  
J. & A. CHURCHILL  
11, NEW BURLINGTON STREET  
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1888.





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*Especially in Relation to Laryngeal Neoplasms.*

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PRELIMINARY REMARKS.

WE propose to treat of the pathological anatomy of diseases of the throat, more particularly in its practical aspect. Bearing in mind the ever-increasing literature devoted to the specialties of laryngology and rhinology, we do not think it desirable to occupy much of the ground which has been already well covered by many excellent text-books and treatises accessible to all. What we have desired to accomplish is the production of a series of plates and drawings of specimens, illustrating important pathological facts, of practical value to the practitioner, both as regards diagnosis, prognosis, and treatment. The enormous clinical and pathological material at the disposal of the authors enables them to do this, they hope, in a satisfactory manner. A large number of specimens has been at our disposal for preparation of sections. Only the best of these have been selected for drawing, those, namely, which are illustrative of typical and important pathological points. Each specimen represents some hundreds of sections, and where we have not been able to obtain from our own clinical and pathological material specimens typical of what we desired to show, we have been fortunate enough to receive pathological specimens from fellow-physicians, whose kindness in allowing us to use the same we herewith gratefully acknowledge. We would especially thank Sir Morell Mackenzie for allowing us to draw upon his large collection of laryngeal growths; also Dr. J. W. Bond, for an excellent specimen of papilloma of the tongue; Dr. Percy Kidd, for sections of an angioma of the larynx; and Dr.

Preliminary  
remarks.

Hunter Mackenzie, of Edinburgh, for an epithelioma of the larynx. The plates have been executed with every possible effort to secure artistic skill and truthful delineation, and have been entrusted to Messrs. Danielsson & Co., who have executed their task with great ability. The drawings from nature made by Mrs. Danielsson are models of artistic beauty, and our personal supervision has been constantly exercised to secure absolute accuracy of the same.

In the first part of our work we propose to deal with neoplasms.

### LARYNGEAL GROWTHS.

**Laryngeal neoplasms** occur as benign or malignant tumours. We shall treat first of the benign, or innocent tumour formations. These may be grouped clinically as follows :—

1. Papillomata.
2. Fibromata.
3. Cystic growths.
4. Angiomata.
5. Lipomata.
6. Enchondromata.
7. Myxomata.
8. Lymphomata.
9. Tumours composed of thyroid-gland tissue.
10. Adenomata.

Many of these are merely curiosities, but it is possible that, were microscopical examination of the removed tumours more persistently conducted, some forms would be found to occur more frequently than is at present thought. For instance, it is not always easy to tell, from the clinical appearances, whether a tumour be a papilloma or fibroma ; and a growth removed by one of us, and presenting all the signs of papilloma, was subsequently found to be a lymphoma. All laryngologists know also the difficulty of determining by clinical appearances whether a growth be malignant or benign. We have not included in the above list “tubercular and syphilitic tumours of the larynx,” preferring to deal with these under another heading.

With regard to the **etiology** of benign growths of the larynx, we must admit a predisposition and an exciting cause. There is no doubt that occasionally they are congenital (e.g., the well-known case of Edis, of a child which died of suffocation thirty-seven hours after birth, and in which a cystic growth was found in the larynx), and possibly many cases of papilloma of the larynx in young children are of this nature. French writers sometimes speak of a "polypoid diathesis," which, however, is very doubtful. Virchow spoke of a local predisposition, and Oertel has gone so far as to refer the individual predisposition to a general tendency to scrofula and tuberculosis. In many cases inquired into by him scrofula, anæmia, chlorosis, and tubercle could be traced in the families. This etiological connection is more particularly traced in those cases in which the growths occur in early life. In the adult, the cause has been sought in chronic catarrhs of the larynx by most observers. Gottstein denies that chronic laryngitis can be a cause, but asserts that it is the common effect of laryngeal growths. We are in a position to affirm positively that papillomata may develop out of chronic laryngitis. These cases are not often seen at the commencement, but we have lately watched the papillomata appear and grow in the larynxes of two patients affected with obstinate chronic laryngitis, the mucous membrane of which was previously entirely free from such growths. Excessive use of the voice has for long been looked upon as a common etiological factor in the production of laryngeal neoplasms. Gottstein relates a curious case, occurring in the practice of Sommerbrodt, in which a mucous polypus was developed at the anterior commissure of the vocal cords in a clergyman eighty years of age, probably as the result of suddenly resigning the use of his voice, with relinquishment of his profession.

Etiology of  
laryngeal  
neoplasms.

That a laryngeal growth may be pathologically "benign," and yet possess certain **clinical aspects** of local "malignancy," is well known. Gerhardts long ago drew attention to the fact that the removal of a papilloma from one situation, accompanied with wounding of tissue at other spots, even

Clinical aspect  
of benign  
neoplasms.

perfectly healthy, to all appearance, is sometimes followed by secondary crops of papilloma at these spots, giving to the growth a sort of local contagiousness. A property possessed by papillomatous growths, in particular, is their tendency to recur at the original site, just as malignant tumours do. Another singular character possessed by them is that of occurring sometimes in heterologous situations, *i.e.*, in spots where papillæ do not usually occur. They endanger life, not as cancers do, by their profound influence upon the constitutional system, or by invasion of important neighbouring organs, but merely by their local effects, as offering obstruction to the normal breath-way, in degrees varying with their situation and size. They lead to dysphagia only, as a rule, when interfering mechanically with the movements of the epiglottis. The vocal function is disturbed in most cases, or abolished, and it is important to note that the smaller and more sessile growths closely incorporated with the substance of the vocal cord will often lead to a greater degree of aphonia than larger and pedunculated tumours. This is supposed to be because the vibrations of the cords are more interfered with in the former case. Fibromata, from their frequent origin in the submucous portions of the vocal cords, and close incorporation with their fibres, are especially apt to destroy the powers of vocalization. A growth may be so situated as to come between the vocal cords during phonation (or respiration), and cause aphonia by preventing their approximation, or dyspnoea by occluding the glottis. Growths situated away from the region of the glottis or vocal cords may give rise to few or no symptoms, except a slight degree of chronic laryngitis. Small growths situated below the vocal cords may escape detection by an inexperienced laryngoscopist. The detection of laryngeal growths in young children is not always easy. Difficulty of breathing (sometimes markedly stridulous) and aphonia should suggest their presence, and even if a laryngoscopic examination is impossible, it is not difficult to introduce the finger into the larynx, and gently detach a portion of the growth with the finger-nail. By removal of a piece no larger than a pin's head in this manner, we have

been enabled to make a microscopic diagnosis of papilloma in the case of a young child sent to us by a very able surgeon for an opinion. It is often impossible to determine the nature of a growth in the larynx by simple inspection. A portion should always be submitted to microscopic diagnosis. The situation, colour, size, &c., of a growth by no means necessarily indicate its nature. The microscope thus becomes the only certain diagnosis, and by systematically adopting this method of examination grave errors of diagnosis, prognosis, and treatment may be avoided.

Importance of  
microscopical  
examination.

The **locality** of benign growths in the larynx varies. The anterior portions of the vocal cords have a greater predilection for neoplasms than the posterior. The subglottic region is less frequently affected than the upper regions, but growths often spring from beneath the anterior commissure of the vocal cords. The mucous membrane of the ventricular bands, aryepiglottic folds, and arytenoid region is less often the site of neoplasms. The epiglottis is frequently the seat of growths, its lower (laryngeal) surface most commonly presenting papillomata, and its upper (lingual) surface cystic growths. Benign growths are sometimes met with in the trachea.

Situation of  
benign growths..

It is worthy of remark that the interarytenoid region, which is so seldom the seat of benign neoplasms, is very commonly the situation of the polypoid vegetations of tuberculosis.

A very important question is that of the **course and terminations** of benign growths. Whereas papillomata tend to grow, sometimes slowly, often quickly, fibromata and other benign tumours, as a rule, possess a very slow rate of growth. In the former, rapid increase of size may be noticed within a few months; in the latter, it may occupy years. The accurate examination, therefore, of portions removed becomes extremely important. Papillomata sometimes undergo fatty or cystic degeneration, or even exceptionally caseous degeneration (Causit) or suppuration may detach them (Schwartz). A few cases are on record in which the tumour has been spontaneously extruded in its

Course and  
terminations of  
benign  
neoplasms.

entirety. It not unfrequently happens that small particles are detached and coughed up.

On the ground that operative interference may tend to convert an innocent into a malignant growth by irritation, it has been proposed by some laryngologists (Lennox-Browne, &c.) to abandon the employment of endolaryngeal instrumental treatment unless life is endangered. It has been thought that the performance of tracheotomy, by giving physiological rest to the larynx, will diminish or even cause the disappearance of the growths. The method is frequently adopted in children, both because it is sometimes impossible to operate upon them without preliminary tracheotomy, and also in order to allow time for the larynx to develop, until a period at which removal of the growths will be easier. Virchow maintained that papillary growths were very prone to degeneration into sarcomatous, cancerous, cartilaginous, or cystic formations. The question whether benign growths ever degenerate into malignant will be discussed later.

## I. PAPILLOMATA.

Structure of  
normal laryngeal  
mucous  
membrane.

Researches upon the **structure** of the normal laryngeal mucous membrane (Coyne, Klein, Verson, and others) have shown that the mucous membrane projects into the epithelium as papillæ on both surfaces of the epiglottis, and upon both surfaces of the vocal cords, and upon a limited surface of the aryepiglottic folds—viz., the folds produced by the cartilagine corniculatæ (Verson). These papillæ are largest upon the vocal cords. The epithelium covering the posterior surface of the epiglottis is stratified pavement epithelium. The same variety of epithelium covers the margin of the ventricular bands, the inner surface of the arytenoid cartilages, and the vocal cords. In other regions the epithelial covering is ciliated.

These facts have an important bearing upon the question of the points of origin of papillomata. When these are isolated it is rare to find them springing from any other region than the vocal cords, and chiefly from their anterior and middle portions, or the anterior commissure. They rarely occur on other regions, but they may be disseminated



over regions of the mucous membrane which are not normally furnished with papillæ; and though in these situations they are usually covered with stratified pavement epithelium, they have been known in a few cases to be invested with cylindrical ciliated epithelium (Morell Mackenzie).

**To the naked eye** papillomata appear as single or multiple growths, sessile, or pedunculated, but it is often impossible to make out distinctly their point of origin. In colour they are pale, grey, or red, but when very vascular may be deeply injected ("Teleangectatic papilloma" of Ariza). Their size is very variable. They may be small as a millet seed, or so large as to block up the orifice of the larynx almost completely. Oertel has differentiated three varieties of papilloma which can be detected laryngoscopically.

Naked eye  
appearances of  
papilloma.

1. Rosy or deep red, warty tumours, situated on the free edge or surface of the vocal cords, or at the anterior commissure, varying in size from a hemp seed to a haricot bean. Though usually single these may be multiple.

2. Greyish tumours of distinct papillary aspect, situated by a broad base upon the vocal cords, and surrounded by smaller groups of vegetations.

3. Grape-like, mulberry-shaped, or muriform tumours of soft consistence, more or less filling up the cavity of the larynx, springing from the ventricular bands and their neighbourhood, or from the epiglottis.

Virchow describes the **growth of papilloma** from situations where there are normally no papillæ (just as in other parts where papillæ occur) by production of exuberant cell growth of the superficial epithelial layers, indicated first as a small roundish knob-like projection, or flat elevation. At first only very small, amorphous, granular buds, it is only later that cells become visible. They gradually increase by cell multiplication and form papillary processes. A process of connective tissue entering from below forms a stroma, into which projects a vascular loop. All parts then grow simultaneously. The epithelial growth may become so exuberant that actual granulation is developed.

**Methods of Examination.**

The mode of examination of growths in the larynx is extremely important, as unless carefully performed, erroneous conclusions might be arrived at. This applies to those growths, portions of which are removed during life, and of the nature of which it is requisite to have precise knowledge, both for the purposes of treatment and of prognosis.

**Hardening.**

The portions of tumour removed by the forceps or other instrument should be placed directly into absolute alcohol to harden; the hardening process is accomplished in an hour or two, or in twenty-four hours, according to the size of the tumour removed. With the tumour are often brought away shreds of epithelium and mucus.

**Staining.**

The best staining liquid is borax-carminé,<sup>1</sup> the composition of which is as follows:—4 grammes of borax and 3 grammes of carmine in 100 cubic centimètres of warm water; after solution 100 cubic centimètres of alcohol (70 per cent.) is added, and the mixture filtered.

The tumour (or a part of it, if it is larger than a bean) is placed in this liquid for twenty-four hours, at the temperature of a warm room; it is then allowed to soak for ten to fifteen minutes in acid-alcohol (methylated spirit, 100 cubic centimètres, strong hydrochloric acid 5 drops). It is then transferred to absolute alcohol, in which it ought to remain for fifteen to thirty minutes; but it may remain much longer, and it is advisable, if many tumours are to be examined, to stain them together and preserve them in absolute alcohol until there is an opportunity for sectionizing them. From the absolute alcohol, the stained mass is transferred to oil of cloves to clarify it, and it must not be left in this too long, as the oil tends to distort and shrivel it. A few hours is sufficient to clarify a piece of tumour the size of a pea. From the oil of cloves it is transferred to oil of turpentine, and then to melted paraffin, in which the mass is to be kept at a temperature just sufficient to melt the paraffin, for two to five

<sup>1</sup> The solution may be purchased ready made from dealers in microscopic reagents.

hours, according to the size of the tumour. In the winter a paraffin melting at 100° F., and in summer one melting at 110° F. is the best to use. After soaking in paraffin the tumour is well permeated with it. It must now be mounted in a little paper or cardboard box, in such a way that sections can be made perpendicular to the base of the tumour. For very small tumours (which are often most important in the matter of prognosis) this is often difficult; but the difficulty is much diminished by examining the growth carefully with a lens while it is in the melted paraffin. Sections are best cut with a sliding razor (as, *e.g.*, in Swift's microtome), and placed in a watch glass containing oil of turpentine, to remove the paraffin. When this is quite dissolved away, the section must be transferred to a slide, the turpentine soaked off with blotting paper, and the specimen mounted in Canada balsam dissolved in xylol.

If it is requisite to preserve the tumour after a few sections are made, melted paraffin is poured over the cut surface. Thus excluded from the air it will keep for months.

This method has been thus detailed because it is the best for examining these tumours, especially if they are small. Though the process is a long one, the results obtained are worth the time expended, especially as accurate diagnosis is, in most cases, of the greatest importance in the matter of treatment. All tumours of the air-passages may be examined in this manner.

### **Pathological Anatomy.**

The pathological anatomy of papillomata growing from membranes covered with stratified epithelium is very simple. Such tumours are composed of digitations, simple at first, afterwards branched. Each digitation, even the smallest, is covered with a layer of stratified epithelium, in the centre of which is a core of fibrous tissue containing blood-vessels. The core is separated from the superimposed layer of epithelium by a basement membrane.

Pathological  
anatomy of  
papillomata.

There are variations in different tumours, or even in different papillæ of the same tumour, which render it important

to consider the epithelium, the basement membrane, and the fibrous core under separate headings.

**The Epithelium** covers each papilla, passing into the furrows between the papillæ, both primary and secondary. At the edge of the tumour it passes into the normal epithelium covering the part, whether of the tongue, the epiglottis, the ventricular bands, or the vocal cords. At its junction with the normal epithelium it is often thickened (Fig. 2, Plate IV.), and this thickening may be of greater or less extent. There may be, for example, a thickening over a large extent—a pachydermatous condition—from which a few single papillæ spring. This is a condition seen not uncommonly in the early stage of papilloma.

The epithelium, as stated, passes in an unbroken line from one papilla to the other, and *does not in any place dip down* (forming finger-like projections) *into the fibrous core*. This is well shown in the figures in Plates I. and II.

It is composed of the same layers as in the skin; below, where it rests on the basement membrane, the cells are more or less columnar in shape; these cells are stained deeply by carmine (see Plate I.). Above this are several layers of homogeneous oval cells, each with an oval nucleus. Near the surface these cells become more and more flattened, until they form flat plates, which are cornified in the older papillæ. There is relatively a greater number of oval cells in the epithelium covering the papillæ than in the normal epithelium, but they are of the same character as in the latter.

The epithelium towards the surface very often becomes vacuolated, whereby the cells are enlarged; and the cells may burst, leaving an irregular and frayed edge to the papillæ. This is shown in Plate III. The vacuolation sometimes occurs in groups of cells in the width of the epithelium of a papilla, giving the appearance of a nest; careful observation, however, soon detects the change that has occurred. In sections of compound papillomata, *i.e.*, those with numerous secondary papillæ, a curious appearance of nests is often observed in the epithelium (Fig. 3, Plate IV.) These “nests” are seen in some parts as simple

aggregations of cells in the width of the epithelium of a papilla (Plate I. *b*), cells which, like the lowest cells of the papillæ, are stained deeply with carmine ; in other parts, a central core is seen in them, which in some specimens is found to consist of fibrous tissue. This last point shows them to be merely cross-sections at various levels of secondary papillæ. On close inspection they bear no resemblance to the nests of epithelioma. The latter have no central core of fibrous tissue, and are collections of flattened or oval epithelium.

In some sections of compound papilloma, the lowest layer of epithelium seems to merge with the round cells of the fibrous core. This is only apparently so ; as the epithelium under a low power of the microscope is seen to still preserve its unbroken line, and the appearance is really produced by the fact of the indistinctness, or sometimes absence of the basement membrane in the smaller papillæ of the compound papilloma.

**The Basement Membrane** in the large papillæ of compound papilloma, and in the early stage of all papillomata, is quite distinct, and forms a limiting membrane to the epithelium. In the secondary papillæ, as has just been mentioned, it is often indistinct, or even lost, and may be ruptured in the course of preparation of the specimen.

**The Fibrous Core** varies in character greatly. It may be composed simply of fibrous tissue, as shown in Plate I., and Plate II., Fig. 1., or it may have a large number of round cells in its composition (as in Fig. 2., Plate II., and Fig. 1., Plate IV.), or again it may be very myxomatous, composed of branching cells separated by fluid, as in Plate III. The number of round cells bears some relation to the vascularity, and perhaps to rapidity of growth of the tumour, and varies in different parts of the same tumour.

**The Vascularity** of the stroma varies greatly. Most papillomata have only a small number of vessels at the base, some running up the papillæ (Plates I. and II., Fig. 1.). In others the vessels are so numerous that the term "vascular papilloma" might be applied to the tumour. Such, for example, was the tumour from the tongue, of which Fig. 2,

Plate II., is a drawing. The vessels are sometimes well-developed, with an external fibrous coat, a middle muscular, and an internal coat; but, as a rule, they are channels in the stroma, with walls formed by a single layer of flattened cells (see Fig. 2., Plate II.)

**The Diagnosis between Papilloma and Epithelioma and the Degeneration of Papilloma into Epithelioma** are questions which will be dealt with fully when we treat of Epithelioma. We may, however, here indicate the important points in the anatomy of simple papilloma, which are :—

1. The integrity of the basement membrane, and even, where this is indistinct, the preservation of the epithelium in an unbroken line.
2. The absence of finger-like projections of the epithelium into the stroma.
3. The so-called “nests” in the epithelium of the papillæ bear no real resemblance to the “nests” of epithelioma.





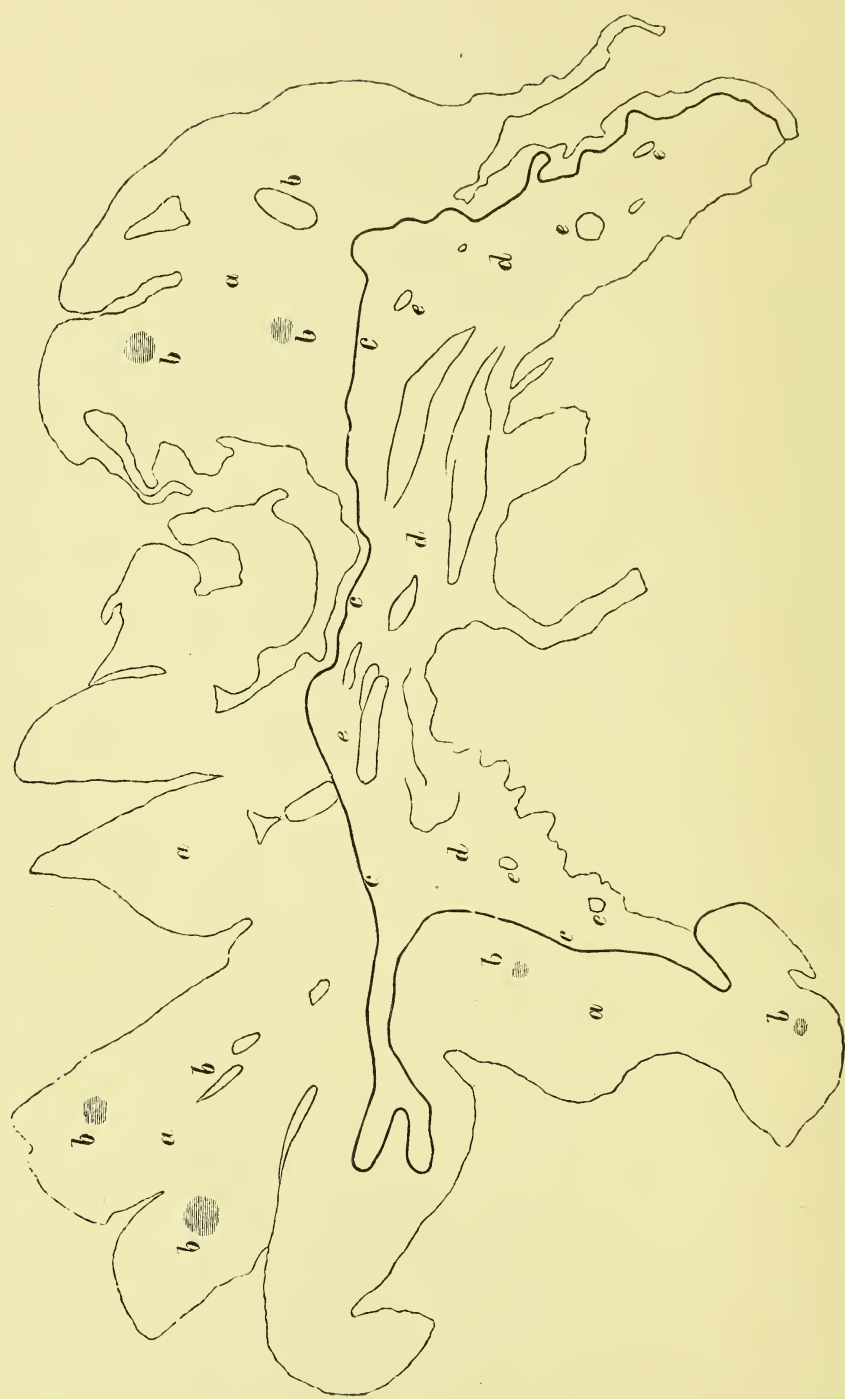


PLATE I.—PAPILLOMA OF EPIGLOTTIS, removed with forceps. No recurrence. *a* Epithelium ; *b*, Secondary Papillae ; *c*, Basement Membrane ; *d*, Stroma ; *e*, Vessels, some containing blood.—Hartnack ; Oc. 3, Obj. 4, tube drawn out.

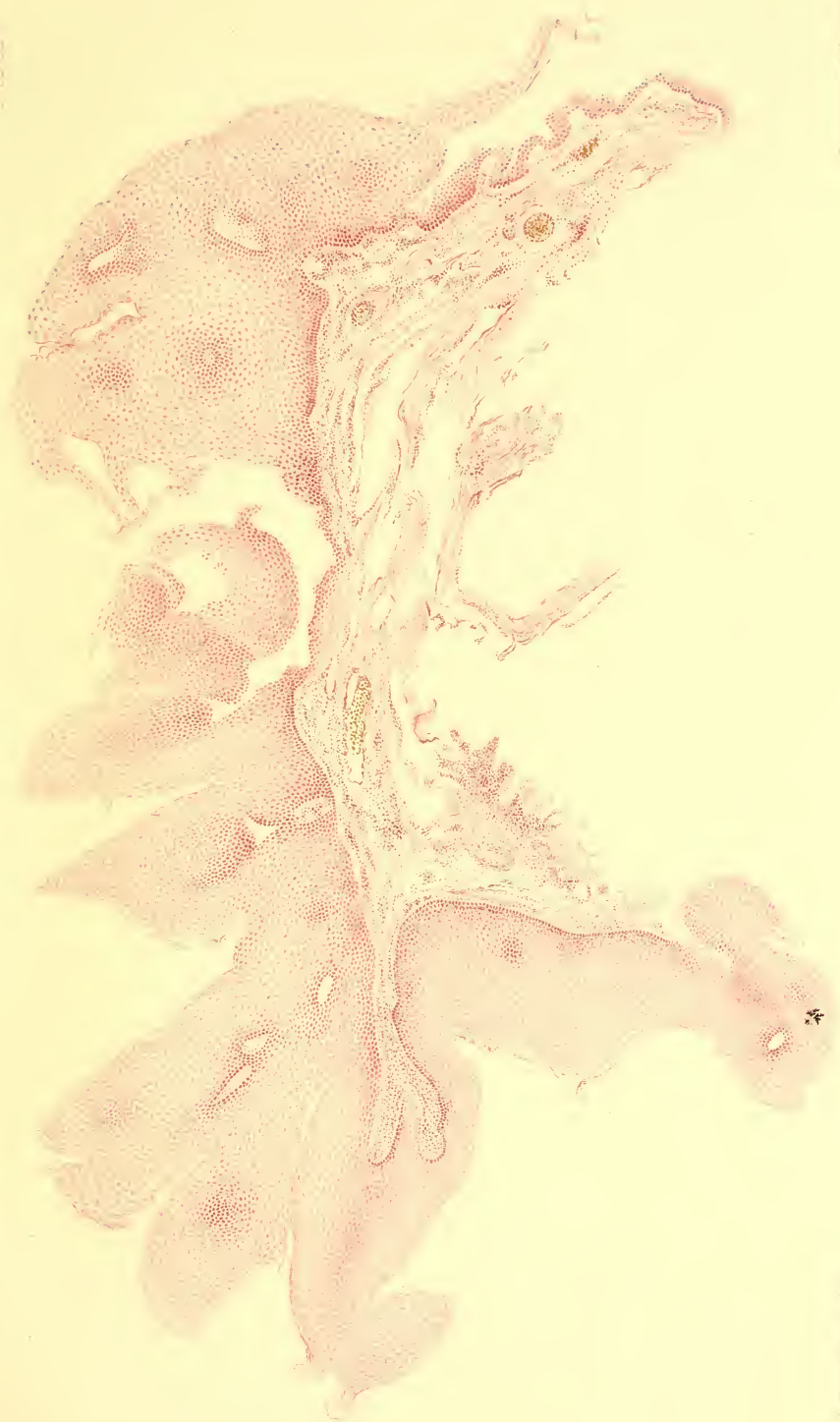








PLATE II. Fig. 1.—PAPILLOMA OF LARYNX (second extraction by forceps, two and a-half months after first). *a*, Epithelium; *c*, Basement Membrane; *d*, Stroma; *e*, Vessels. The stroma is fibrous, and has very few vessels. The third extraction of tumour, three weeks later, presented the same characters.—Hartnack: Oc. 3, Obj. 4, tube drawn out.



PLATE II. Fig. 2.—PAPILLOMA OF TONGUE. *a*, Epithelium; *b*, Secondary Papillæ; *c*, Basement Membrane; *d*, Stroma; *e*, Vessels. The Stroma is more cellular than Plate II. Fig. 1, and is very vascular.—Hartnack: Oc. 3, Obj. 4.





Fig. 1



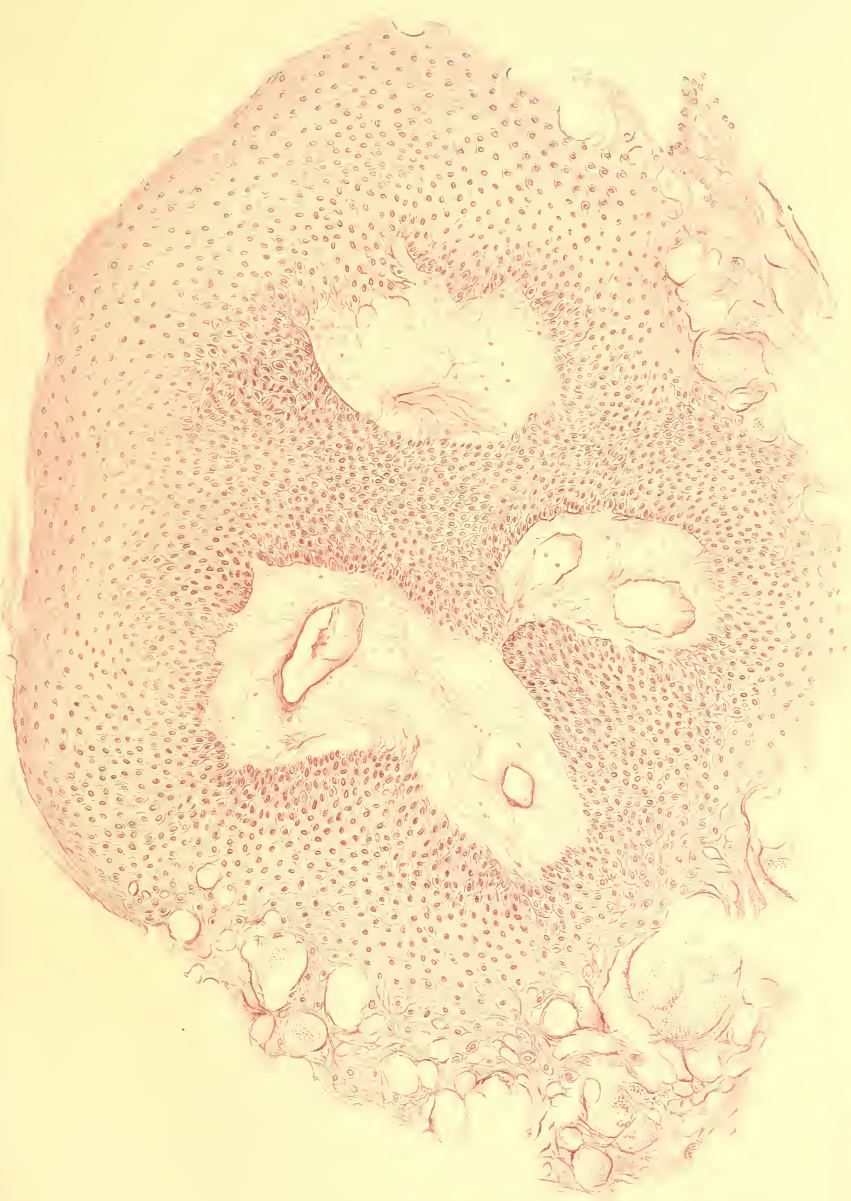
Fig. 2







PLATE III.—PAPILLOMA OF LARYNX (same specimen as Plate II. Fig. 1), cut transversely. *a*, Epithelium; *b*, Basement Membrane; *c*, Stroma; *d*, Vessels; *e*, Vacuolation of the Epithelium. In this specimen the Stroma is seen to be fibro-myxomatous, and the vacuolation of the external Epithelium is very marked.—Hartnack, Oc. 2, Obi. 7; reduced about  $\frac{1}{4}$ .







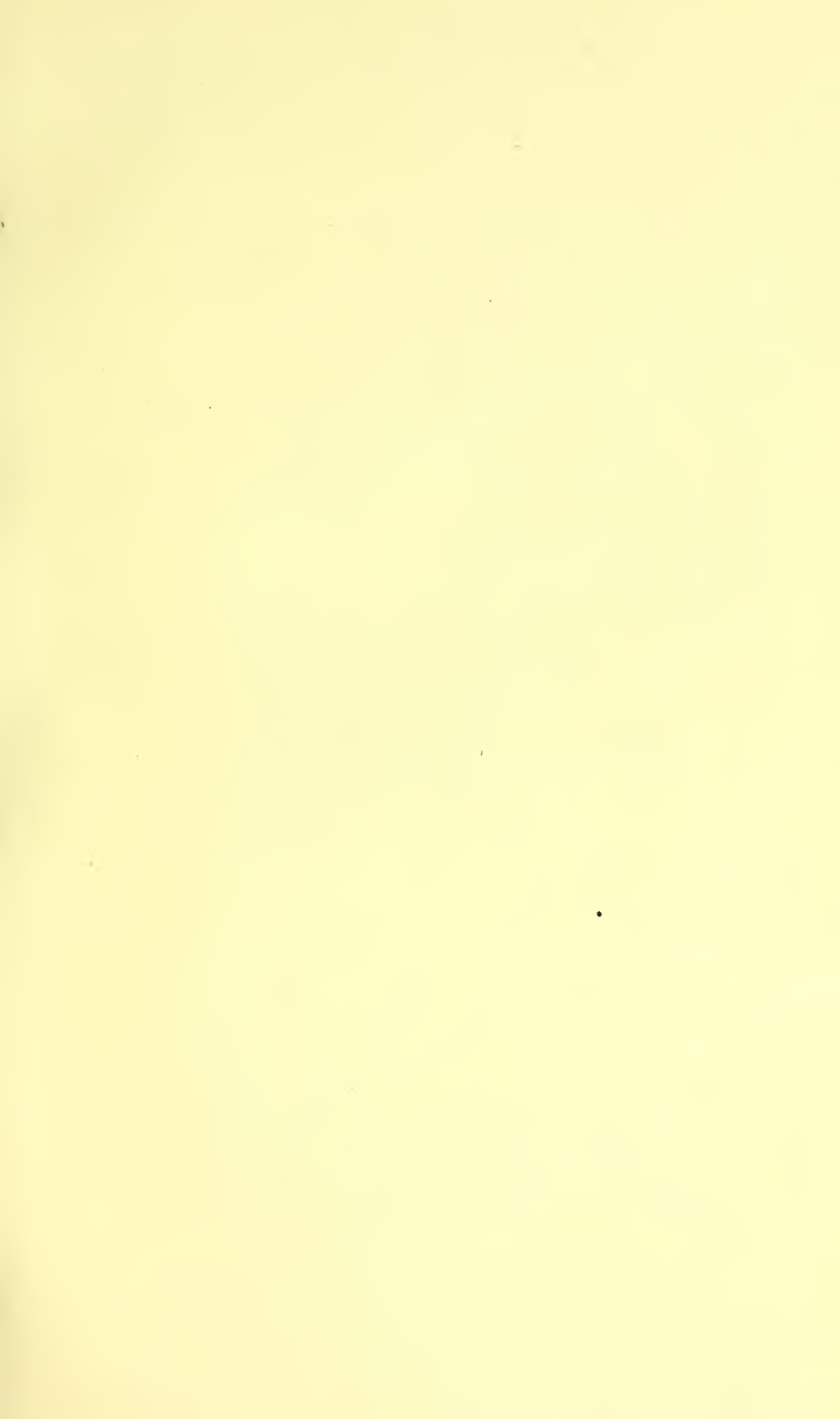


PLATE IV.



FIG. 1.

PAPILLOMA OF LARYNX.—To show small celled Stroma.—Hartnack :  
Oc. 2, Obj. 4 ; reduced  $\frac{1}{2}$ .

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FIG. 2.

PAPILLOMA OF LARYNX.—Showing junction of the new growth, with  
normal Epithelium.—Hartnack : Oc. 2, Obj. 4.

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FIG. 3.

PAPILLOMA OF LARYNX.—Transverse Section, showing spurious  
appearance of “cell nests.”—Hartnack : Oc. 2, Obj. 4 ; reduced  $\frac{1}{2}$ .



Fig 1

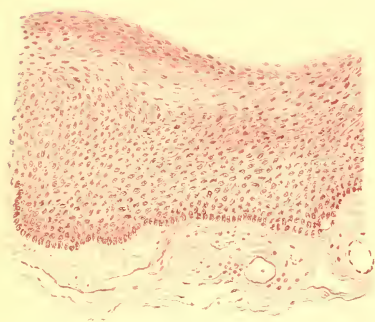


Fig 2

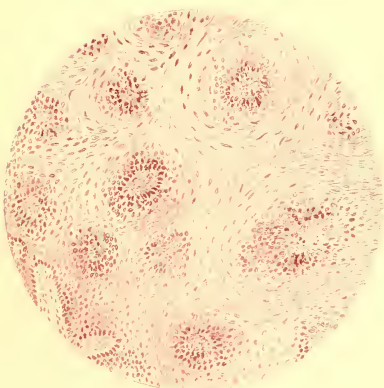


Fig 3







STUDIES  
IN  
PATHOLOGICAL ANATOMY

*ESPECIALLY IN RELATION TO LARYNGEAL  
NEOPLASMS*

II. FIBROMA; III. CYSTIC TUMOURS;  
IV. MYXOMA; V. ANGIOMA;  
VI. LIPOMA; VII. ENCHONDROMA;  
VIII. LYMPHOMA.

BY

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# STUDIES IN PATHOLOGICAL ANATOMY,

*Especially in Relation to Laryngeal Neoplasms.*

(Continued from page 14.)

## II. FIBROMA.

Fauvel remarks, "It is pretty rare to find fibrous polypi in the larynx"; he had met with only 11 cases out of 300. Frequency.  
A good many of the cases described by this author as myxomata are, however, mixed forms of fibroma and myxoma. Mackenzie, on the other hand, remarks that fibromata occur next in frequency to papillomata.

Purely fibromatous tumours, however, appear to occur very rarely in the larynx, and the commonest form of so-called fibroma is the fibro-myxomatous growth, or so-called "fibro-cellular tumour." Occasionally these are very vascular, and even angiomatous, but whilst mixed forms are the commonest, the pure fibroma is comparatively rarely met with. Fibromata are situated generally in the sub-mucous tissue (Mackenzie), or even spring from the perichondrium. Situation  
They are generally developed on the anterior regions of the vocal cords, commonly on the upper surface, but not usually on the free edge.

They have occasionally been found attached to the ventricular bands and epiglottis. Sometimes they are situated under the vocal cords, and then most commonly at the anterior commissure. Whilst occasionally pedunculated, they are more commonly sessile; and it is most usual for them to have a smooth rounded appearance in contradistinction to the warty or mulberry-like appearance of papilloma. Appearances and characters.  
Generally, and especially when sessile, they

<sup>1</sup> Förster. Hdbuch. der Speciel. Pathol. Anat. Leipzig, 1854.

appear to be firmly incorporated with the tissues from which they spring. They vary in colour from pale grey to bright red: in consistence they are sometimes hard, at others soft, and easily indented with a probe. This character has caused them to be divided into two varieties—the **hard** and the **soft** fibromata. The former are considered to be composed of dense fibrous tissue, and to be more closely incorporated with the sub-mucous tissues. The latter contain more intercellular fluid, and have wider meshes of tissue, are more readily detached, and are supposed not to extend so deeply into the sub-mucous tissue. The fibromatous tumour is generally invested exterrally with a well-defined epithelial layer. Mackenzie remarks that in some of the specimens examined by him this epithelial layer was wanting. This has appeared to be the case in some specimens examined by us. “The chorditis tuberosa” and “the singers’ nodes” of German authors are both examples of development of fibrous tissue. These little nodular hypertrophies, which are situated on the surface or free border of the vocal cord, and which arise out of chronic laryngitis, do not deserve to be included among neoplasms, being the result of chronic inflammation.

Chorditis  
Tuberosa, &c.

Fibromata are occasionally said to ulcerate, but this is very exceptional, and ulceration of any growth should lead to great suspicion of malignancy. The **ulceration** of a fibrous tumour is generally quite superficial, being merely erosion of the epithelial layer. Sometimes there is more or less rich vascularization both of the tumour and its surrounding, and these vessels may be eroded in the process of superficial ulceration. Copious bleeding may result, and, as Stoerk has remarked, such tumours may be mistaken for vascular growths, or the bleeding for hæmoptysis. A remarkable case of this kind, “aphonia, hæmoptysis, and large fibroid tumour in the larynx,” is related by Stoerk,<sup>1</sup> and Chiari recently recorded a case of laryngitis hæmorrhagica combined with fibroma.<sup>2</sup>

Ulceration and  
hæmorrhage.

Anatomy.

The anatomy of fibromata is well shown in the two figures

<sup>1</sup> “Krankheiten des Kehlkopfs,” 1880, p. 408.

<sup>2</sup> “Observations on Diseases of the Throat and Nose,” 1887.

(Plate VI., Fig. 2, and Plate VII.). In the first figure a section of a soft fibroma is shown, composed of myxoid and fibrous tissue, and covered with the normal laryngeal epithelium. In the second figure the tumour is seen composed almost solely of closely-set fibrous tissue, with interspersed glandular masses, and a partial covering of epithelium. Both tumours are but slightly vascular.

### III. CYSTIC TUMOURS.

Cysts of the larynx are said by some writers to be rare tumours. Moure, of Bordeaux, published, in 1881, a careful essay on cysts of the larynx, in which he had collected sixty-eight cases, thirty-four of which were entirely new.

The most complete record of cases collected up to the present time is that of Ulrich, of Wurzburg. He gives details of sixty cases of cysts of the epiglottis; fifty cases of cysts of the vocal cords; eight cases of cysts of the ventricles of Morgagni, and eight cases of cysts of the arytenoid cartilages and ary-epiglottic folds. Massei has seen thirteen cysts in 200 cases of laryngeal tumours, and Garel has recently related sixteen cases of cysts of the larynx. This makes a total of 165 cases recorded of cystic growths in the larynx. Moure's definition of a cyst is good. We should understand by a cyst (1) a tumour possessing a clearly circumscribed and organized wall, the cavity not communicating either with the exterior, with any vascular, serous, or mucous channel; (2) the contents of the tumour are generally liquid or serous, sometimes thick, or even gelatinous or colloid.

Frequency of occurrence.

Definition.

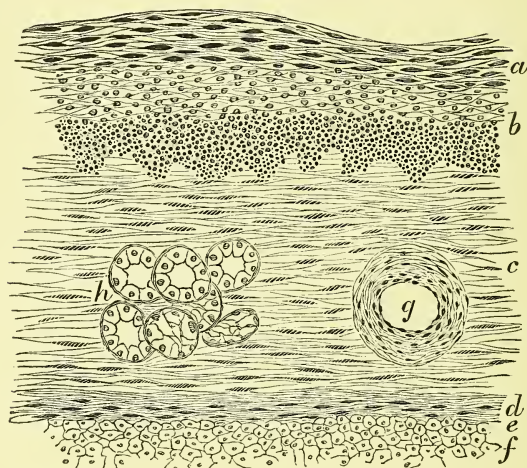
The contents may also be sanguineous, and the case recorded by Johnson, which is sometimes included under angiomas, was a vascular cyst. Often they contain degenerated epithelial cells, granular detritus, and fat globules, and sometimes blood corpuscles. They have been found to have atheromatous contents (Schwartz).

Contents.

The **histological structure** of cysts of the larynx is the same as that of similar growths occurring in other spots.

Pathological anatomy.

Moure, who examined such a growth springing from the epiglottis, reported as follows (see Fig.):—"1. A very thick epithelial layer, in which could be distinguished two zones, the most external one (*a*) formed of flattened epithelial cells, and containing a flattened nucleus; the internal layer (*b*) composed of polyhedral uniform cells, with round and granular nuclei. This layer corresponds to the epithelial zone of the lingual mucosa, which consequently forms the external investment of the cyst, and has simply been raised



Section through cyst, adapted from a diagram by Moure ("Kystes du Larynx, Paris, 1881). The figure has been slightly altered by making the different parts of the section more distinct, and the engraver has reversed the drawing.

by the latter; at its internal edge are found some undulations, and the thickness of this first layer is apparently more considerable than normal, being a true hypertrophy of the epithelium covering the tumour. 2. Below this first zone a mucous layer is met with (*c*), evidently much hypertrophied, exhibiting elastic fibres very marked and numerous, strongly coloured by picrocarmine: they are disposed irregularly. Numerous embryonic cells are scattered through it, and these are especially numerous at the points corresponding to the hypertrophy of the epithelial layer. 3. At the innermost portion of the investing layer is a second epithelial

zone (*d, e, f*), forming the investment of the cyst, and composed of two epithelial layers, one coloured red strongly by picrocarmine, and formed of cells, granular and without nuclei; the other, of polyhedral more or less flattened cells, with lengthened nuclei, and in parts showing signs of desquamation. This is identical with the most external layer of the mucosa. Some glandular alveoli were found in a state of degeneration (*h*), and small blood-vessels (*g*) with walls infiltrated with embryonic cells."

Cysts of the larynx are usually described to be retention cysts, originating in occlusion of the duct of a gland. This may be caused either from inflammation (*e.g.*, chronic or acute laryngitis) or thickening of the wall of the duct (Tobold). The secretion accumulates behind the obstruction, the matter increases, the cavity enlarges, and its wall becomes formed of a thin layer of stretched mucous membrane. Desvernine has lately published some excellent observations upon the origin of intralaryngeal cysts. Many authors describe an ampullar dilatation of the ducts of the glands, which favours stagnation of the secretion and obliteration of the outlet with consequent cyst-formation. Desvernine's<sup>1</sup> very careful histological researches make it probable that his views are correct. "The excretory ducts traverse *very frequently* in the supraglottic region, and *constantly* in the infraglottic zone, fibro-elastic structures in a frequent state of energetic distension, and consequently must be compressed violently. Whilst the structures of the bands are in complete physiological integrity, the obliteration is always transitory, momentary, but as soon as congestive or inflammatory derangements occur, of some duration and intensity, then the excretory ducts participate in the general process of hyper-nutrition, their walls become more or less thick, their elasticity is reduced or abolished, and their situation in the midst of structures actively compressing them, are all circumstances which create the best adapted conditions to promote the permanent fusion of their walls."

Mode of origin.

<sup>1</sup> "The Normal and Pathological Anatomy of the Vocal Bands. I. Cystic Growth. II. The Glandular Apparatus." Havana, 1888.



Dermoid cysts have occasionally been found in the larynx (Blane, Mollière).

Situation.

Cysts occur frequently upon the epiglottis, and are then extra-laryngeal, on the vocal cords, or ventricular bands, less frequently springing from the ventricles. Occasionally they may be infraglottic, and exceptionally pedunculated.

#### IV. MYXOMA.

Frequency.

Fauvel places myxomata next in frequency to papillomata, and states that they belong to the variety termed papillary, and quotes Cornil and Ranvier, who further state that elastic fibres are often met with in the substance of the morbid mass. Fauvel also states that it is rare to find fibrous polypi in the larynx; he only records eleven cases out of 300 laryngeal growths in which a microscopical examination was made, and in which it may be presumed the growths were more or less purely myxomatous, and a large number of growths under such terms as myxoid, mucous polypus, myxoma, no reference being made as to microscopic examination, and which were most probably fibro-cellular growths (or "soft fibromata").

Mackenzie states, "these growths (myxomata) are very rare," but fibro-cellular tumours (pink or red-coloured, with smooth surface) have been more common in his practice. The only myxoma with which he has met, was reported upon by Dr. Stephen Mackenzie as exhibiting various kinds of structure in different parts; in some, connective tissue predominating; in others, fibrous tissue; in others, gelatinous tissue; in other parts there was an abundance of papillæ, "a growth which resembles in the first portion described the connective tissue tumour of Vogel, but in the softer parts it approximated closely to a myxoma." It was therefore not a pure myxoma.

In a case of Bruns the growth before removal was regarded as a soft fibroma. It was found microscopically to consist of a capsule, composed of fibrillar connective tissue covered with epithelium, in parts a single layer, in others several layers. Inside the capsule was gelatinous or mucous



tissue, composed of a few cells, varying in size or shape, imbedded in homogeneous inter-cellular substance; the fibrous tissue below the epithelium was not sharply defined from the gelatinous tissue. The tumour was divided into lobes and lobules by numerous transverse partitions. This is probably one of the rare and only true myxomata which have, as yet, been recorded as occurring in the larynx. It is not uncommon to meet with tumours of mixed character, which are partly myxoma, and even partly angioma. Most of the cases which were described by Fauvel as myxoma, and of which no microscopic examination has been recorded, were most probably fibromata of the variety known as fibro-cellular, or soft fibroma, and this accounts for the frequency with which myxomata are mentioned in his work on laryngeal tumours, and the rarity of their occurrence with other observers.

Clinton Wagner described a case of a myxoma (examined by Heitzmann) spontaneously detached after violent paroxysms of coughing from the left ventricle of the larynx of a lady. Dr. Heitzmann described it as "of the size of a "small pea-nut, pear-shaped, greyish-white, of jelly-like consistence, composed of protoplasmic strings in a reticular arrangement, in close resemblance to the structure of the "umbilical cord. The meshes were filled with a fine reticulum of coagulated fibrin and numerous lymph-corpuscles. "The central portion consisted at its periphery of a coarse "reticulum of coagulated fibrin blending with that of the "myxomatous portion, also supplied with numerous lymph-corpuscles. The main mass of the central portion, however, was coagulated albumen only.

"The tumour was a myxoma (polypoid tumour) of a "strictly benign character. Evidently it had grown in the "vicinity of a large—perhaps varicose—sub-mucous lymph-vessel, which, by bursting, produced an inundation of "the tumour with lymph. This fluid partly destroyed the "myxomatous structure, and completely replaced it in the "centre." ("Archives of Laryngology," vol. i., p. 332.)

Eeman, of Ghent, described a myxoma, smooth and round on the surface, with a certain degree of transparency,

situated on the anterior edge of the free half of the left vocal cord, and of grey colour, thought to be a cyst, which was, however, disproved through incision. After removal, microscopical examination showed that "the polyp was covered by the normal epithelium of the vocal cords, presenting small papillæ, under which was tissue of the mucous type, studded with a large number of corpuscles, set at liberty by the rupture of vessels" (Schwartz, p. 31).

King described "a large myxoma of the larynx, in which a microscopic examination was made."

Massei states ("Tumours of the Larynx," Naples, 1885) that he has seen myxomata twice in 200 cases of polypi. The cases of Bruns, Wagner, Eeman, King (?) appear to be the only ones recorded of undoubted pure myxomata. It is not uncommon to meet with polypi of mixed structure; the majority of these growths are fibro-myxomata, sometimes though more rarely angio-myxomata (Schwartz), and occasionally all three kinds are mixed in the same polypus, as in the drawing given, from a case operated upon by Dr. J. W. Bond (Plate VI., Fig. 2). In some of these cases of myxoma the tumour has been spontaneously detached after violent paroxysms of coughing.

## V. ANGIOMA.

Purely vascular or angiomatous tumours are of great rarity in the larynx. Only twelve such cases are recorded.<sup>1</sup> An illustration is given of the microscopical appearances of one of these tumours (operated upon and section cut by Dr. Percy Kidd). Transitional forms of vascular cysts (Johnson, Fournier, &c.), or vascular papilloma (Ariza, Hooper, &c.) have been met with; but these are not true angiomatous growths. Such growths, when occurring in connection with the larynx, are **intra-laryngeal** (in which case they arise from the vocal cords, ventricular bands, or ventricle), or **extra-laryngeal**, in which case they spring from the epiglottis or hyoid fossa. Occasionally

<sup>1</sup> *Vide* Wolfenden: "Angiomata of the Larynx." *Journal of Laryngology*, August, 1888.

they are pedunculated (Fauvel, Elsberg, Kidd, Desvernine), but more commonly are sessile.<sup>1</sup> They may be multiple (Wolfenden).

In appearance they are bright red, blackish or purple in colour, of the shape of a raspberry or mulberry, and of very variable size; but the remarkable colour of the growths has sufficed in all cases to distinguish them. They are usually soft in texture; but Mackenzie's case was described as of peculiar hardness. They resemble in structure the cavernous angiomata of the liver; that is, they consist of spaces, varying in size, but all much larger than a blood capillary, and separated by a trabecular stroma. The stroma is fibrous, and contains a greater or less number of round cells: it may be myxomatous (see Fig. 1, Plate VI.).

Anatomy.

## VI. LIPOMA

Is a rare tumour in connection with the larynx. The four cases recorded in which it has occurred have all been extralaryngeal. In the case recorded by Von Bruns the growth was the size of a hazel-nut, and was attached to the right arytenoid region; in the other two cases, the tumour in one arose from the right ary-epiglottic fold (Jones), and in the other from the left edge of the epiglottis (Schroetter).

The tumours consist of fatty tissue, enclosed in a capsule, which is composed of normal, but stretched, epithelial layers of the mucous membrane (Von Bruns). The fatty lobules are separated by fibrous trabeculæ, and in Schroetter's case large vessels were observed. Fat crystals have been seen in the lobules.

## VII. ENCHONDROMA.

This is a rare tumour of the larynx, and we have been unable to obtain any case for microscopic examination. Only a few cases, indeed, have been placed on record. These tumours have been observed attached chiefly to the cricoid and thyroid cartilages, less frequently to the arytenoid.

<sup>1</sup> A careful essay, by Elsberg, of New York, upon Angiomata of the Larynx, was published in the "Archives of Medicine," 1884.

They vary greatly in structure. Some which might be placed under this heading are merely exostoses, others are masses of cartilage, as a rule not larger than a pea, ossified or not in parts, or with foci of softening. In one case recorded, the cartilaginous tissue was mixed with sarcomatous, forming a chondro-sarcoma; and in a few, fibrous and myxomatous tissue has been noticed (Porter, Caselli).

### VIII. LYMPHOMA.

Lymphoma of the larynx is a very rare growth in that situation. In the works on pathological anatomy no mention is made of its occurrence. Plate V. was drawn from sections made from pieces of a growth removed by one of us. The case was that of a woman, aged forty-three, who for seventeen years had suffered from hoarseness, with occasional complete loss of voice on catching cold. At various intervals pieces of the growth had been removed, but the tumour was never completely eradicated. At the present time (July, 1888) it presents a cauliflower mass of a rosy-red hue, springing from both sides of the larynx above the cords, which are hidden, except on the right side in front. The patient does not suffer much inconvenience, except from the hoarseness. Occasionally, she says, she feels something loose in the throat; she then coughs violently until she brings up a little pellet of the tumour. This greatly relieves her. She has no cough, and is well bodily. None of the superficial glands are enlarged, and she has no symptoms of enlargement of any of the deep glands.

Anatomy.

The structure of the growth, as will be seen by reference to Plate V., is that of a simple lymphoma. It is composed almost solely of lymphoid tissue—that is, a slender structureless stroma, with round cells resembling leucocytes, packed in the meshes (Fig. 1). In parts this lymphoid tissue is more dense, and is collected in roundish masses as in *c*, Fig. 2. The resemblance of these masses to the dense collections of lymphoid tissue which occur in various parts of the body, such as the tonsils and solitary glands of the intestine, is well marked. In parts of the tumour there are

collections of fibrous tissue, of which one is figured at *a*, Fig. 2. Spaces (*b*) represented in this figure are vessels, which are simply channels in the lymphoid tissue ; they are probably both blood and lymph-vessels.

A case was recorded by Clifford Beale<sup>1</sup> of lymphoma of the larynx in a woman, in whom the eyelid and dura mater were also affected with growths of a similar nature, and in whom there was considerable induration of the cervical glands.

<sup>1</sup> *Lancet*, October 15, 1887.

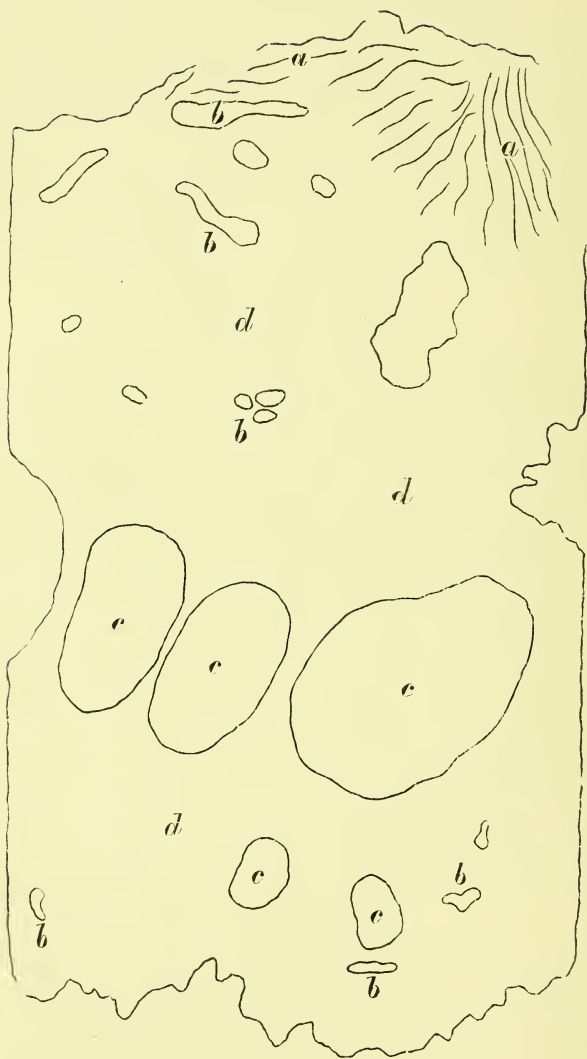


PLATE V, Fig. 2.—SECTION OF LYMPHOMA OF LARYNX. *a*, Fibrous Tissue ; *b*, Vessels in Lymphoid Tissue ; *c*, Lymphoid Nodules ; *d*, Groundwork of Lymphoid Tissue. Oc. 3, Obj. 4.

Fig. 1. A portion of the lymphoid tissue under a high power. Hartnack, Oc. 3, Obj. 7.

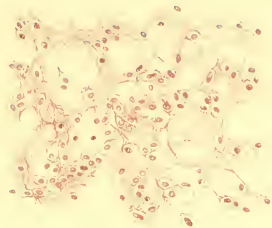
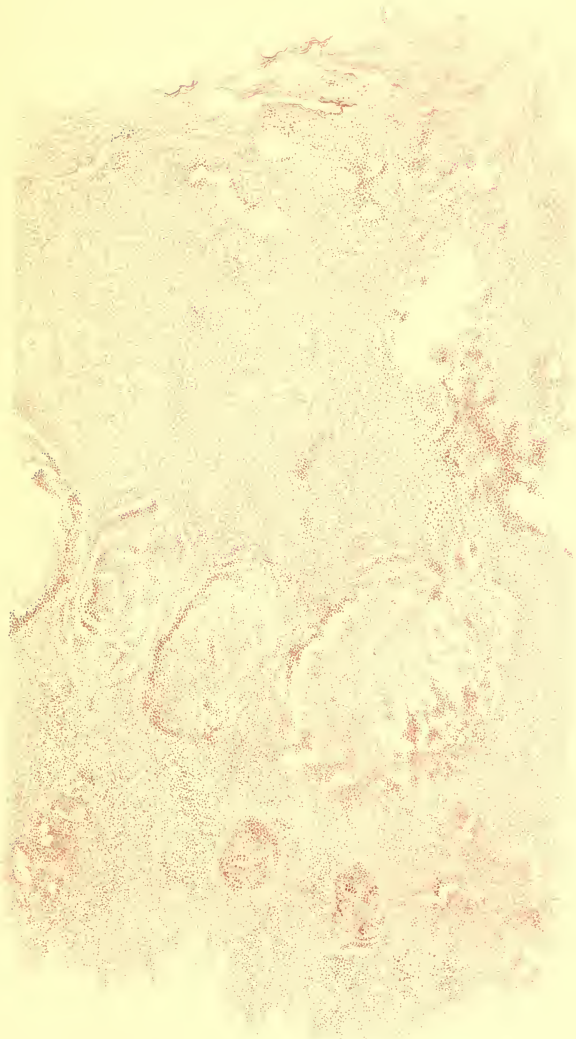


Fig. 1









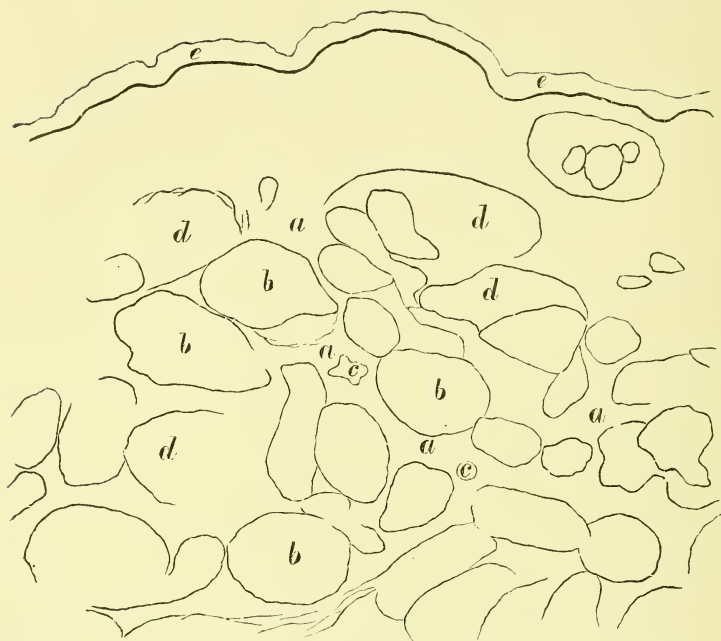


PLATE VI. Fig. 1.—ANGIOMA OF THE LARYNX (from a Section by Dr. Percy Kidd).  
*a*, Fibrous Tissue; *b*, Cavernous Spaces; *c*, Blood-vessels of Stroma; *d*, Blood Clot in Sinuses; *e*, Epithelium. Oc. 3, Obj. 4.

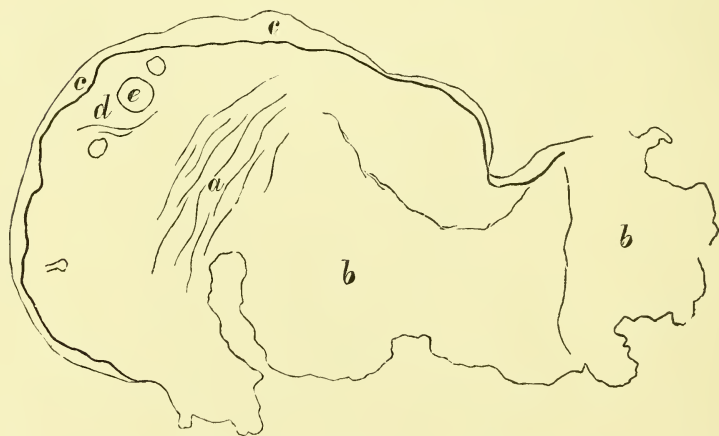


PLATE VI. Fig. 2.—SECTION OF SOFT FIBROMA. *a*, Fibrous Tissue; *b*, Blood Clot;  
*c*, Epithelium; *d*, Myxomatous Tissue; *e*, Blood-vessels. Oc. 3, Obj. 4.

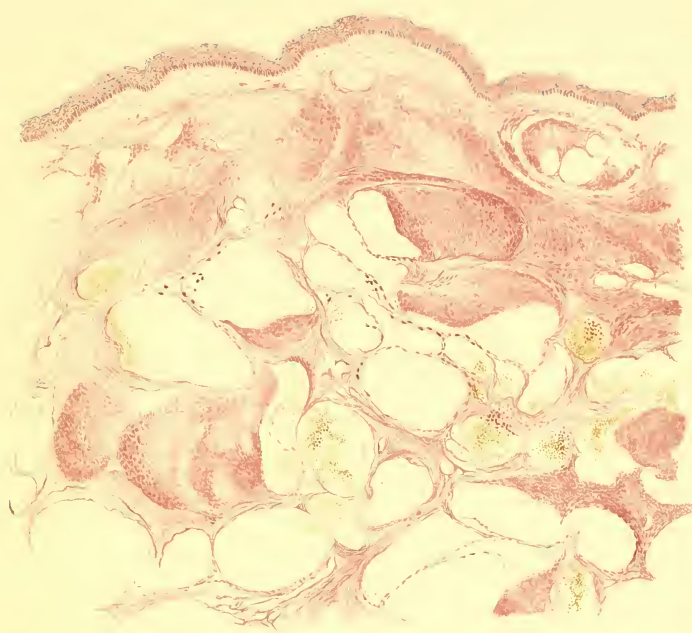


FIG. 1

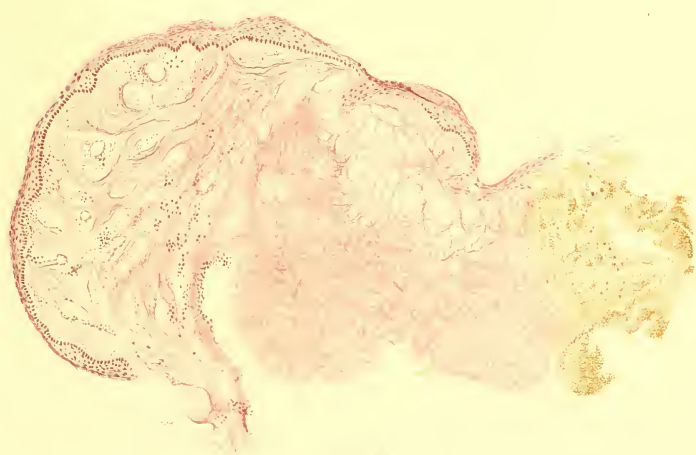


FIG. 2







PLATE VII.—HARD FIBROMA. *a*, Epithelium; *b*, Gland Tissue; *c*, Blood-vessels; *d*, Fibrous Tissue. Oc. 3, Obj. 4.



